DOCUMENT RESUME

ED 177 552 CS 205 156

AUTHOR Martin, Nancy; And Others
TITLE From Information to Understanding: What Children Do with New Ideas.
INSTITUTION London Univ. (England). Inst. of Education.; Schools Council, London (England).
PUB DATE 74
NOTE 34p.; For related documents, see CS 205 154-161
AVAILABLE FROM Export Department, Ward Lock Educational, 116 Baker St., London W1M 2BB, England ($10.00 plus $1.00 postage, for entire set; individual copies are not available)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Cognitive Processes; *Composition (Literary); Foreign Countries; Language Development; *Language Role; *Language Usage; *Learning Processes; Secondary Education; Student Teacher Relationship; *Writing Skills
IDENTIFIERS *Composition Process; England; *Writing Across the Curriculum Project (England)

ABSTRACT

This is one in a series of eight discussion pamphlets produced by the Writing Across the Curriculum Project dealing with some of the issues connected with writing in the schools and their relation to learning. This pamphlet is concerned with what is involved in the learning of new ideas and what part language plays in the process. It includes transcripts of conversations with students working in a variety of school subjects, who are in the process of dealing with new information. (FL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

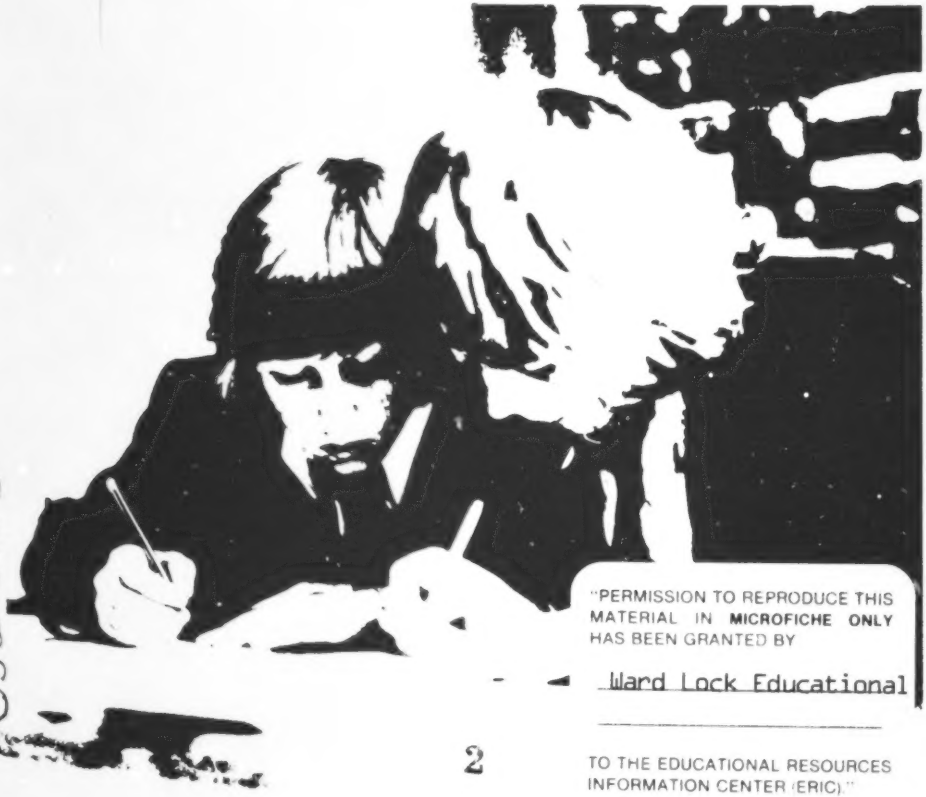
THE SCHOOLS COUNCIL AND LONDON UNIVERSITY INSTITUTE OF EDUCATION JOINT PROJECT
WRITING ACROSS THE CURRICULUM 11–13 YEARS

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

FROM INFORMATION TO UNDERSTANDING

what children do with new ideas



ED177552

CS205156

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Ward Lock Educational

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Published by the Project: Writing across the Curriculum: Schools Council/London University Institute of Education English Dept.

First edition April 1973
Second edition March 1974

©1973 and 1974 the Project Team
Permission to reproduce will normally be given on request

WRITING ACROSS THE CURRICULUM 11–13 YEARS
a Schools Council/London Institute of Education Project
on writing in education

Its task is to consider school practice regarding
- –the uses of writing in different areas of the curriculum
- –the contribution writing can make to learning
- –ways of developing children's writing abilities

It arises from, and aims to apply the findings of, the earlier research project, the Development of the Written Language of 11–18 year olds

Its way of working includes
- –collaboration with teachers in schools, in varying degrees of association, from shared teaching to postal consultation
- –discussion with teachers as widely as possible through meetings and conferences
- –publication of a variety of short working papers, discussion documents and bulletins

The team: Nancy Martin
Peter Medway
Harold Smith

Price:–
20p each post free. Ten or more copies: 12p each post free
Please enclose payment with orders

Obtainable from:–
Export Department, Ward Lock Educational,
116 Baker St., London, W1M 2BB, England.

From Information to Understanding

What Children Do with New Ideas

Writing is employed as an educational activity in most areas of the curriculum. The writing of notes, essays, stories, summaries, poems, answers, personal narratives and so on is a major component of education, in terms both of the time, energy and materials devoted to it and of the importance ascribed to it by teachers.

It is important that such a central educational process should be made as effective as it can be: this means, certainly, that children's writing abilities need to be developed to the full but also, and perhaps for most teachers of more immediate importance, that writing should be used in such a way as to make its maximum possible contribution to *learning*.

In the endeavour to achieve this, we would want to use relevant research. But much research into language is necessarily descriptive, and therefore there is a secondary job to be done of drawing out its implications for practice. The present Project has such a job to do. We are concerned with a particular piece of research*, a five year investigation into the development of writing abilities over the years 11 to 18 which was conducted under the auspices of the Schools Council by the Writing Research Unit of the University of London Institute of Education. We want to 'operationalise' the findings of this research: that is, to work out how they bear on what teachers actually do with writing, to construct a theoretical justification for existing good practice

* at present being prepared for publication.

and to consider possible new ways of working; in other words to contribute to the building of a rationale for school procedure with regard to writing.

Such an undertaking can only be conducted jointly by researchers and teachers of different subjects, since the theoretical understandings about the writing process have to be related to the purposes and procedures of teachers in all areas of the curriculum. Our procedure is therefore to work with teachers in a number of schools and together to take the findings of the research and in the light of them interpret the writing activities which are occurring in the schools and analyse what they are achieving, and to devise and try out alternative possibilities; and then to make our conclusions more widely available through publications, conferences, meetings etc.

It is however our hope that this enquiry will by no means be confined to those teachers with whom the Project team is directly involved, but that an ongoing and widening discussion will take place in schools, local centres and subject associations. (Such discussion is of course already occurring in some places: we would be glad to hear of any group already in existence or contemplated, and would like to help in any way we can – for instance by providing discussion materials or speakers.)

We see our publications, of which this is the first, as a contribution to such discussion. They are likely to take a variety of forms: some will be more polished than others; some will be as long as this, some much shorter; some (we hope) will be written by teachers. They will include reports of work in schools, discussion of writing procedures in particular school subjects and comment on wider curriculum issues.

This paper is our first attempt to relate the theoretical ideas of the Writing Research to the objectives of different areas of the curriculum, and is offered for discussion. It arises, in fact, from discussion we have had with teachers with whom we have been working in three schools. It does not attempt any systematic exposition of the Writing Research, though its central ideas derive from it, but instead looks at a very general concern, one shared by teachers of most subjects, the contribution language

can make in moving from new information to deeper understanding.

We said 'language' rather than 'writing' because writing specifically will not be at the centre of attention this time: rather we want to place writing in the context of the use of language in general. We examine the process that occurs when children use language to learn with: this process is more accessible to the observer when it takes place in *talk*, so our main examples will be of children talking. This will enable us to distinguish between the features of verbal discourse in general which are relevant to learning and the particular contribution which may be made by writing.

Our topic is, then, what is involved in the learning of new ideas and what is the part language can play in the process. Our procedure is to ask the questions about some actual cases. We take a number of children, working in different school subjects, at a point where information has been presented to them and they are taking it on from there.

We start with two boys, Robert and Terry, aged 12. They are having a discussion with an interviewer. With the aid of books and worksheets they have been studying the Upper Thames area and its early inhabitants. Of the facts they have been presented with, the following are important for what follows:

> The rock of the hills where the Thames begins is limestone. Limestone is a porous rock: that is, water soaks down into it. Therefore there is little moisture on the surface and little grows on it.
>
> The valleys on the other hand used to be thickly forested. Early man could till the light soil on the hills and grow wheat and barley, but could not cope with the thick forests in the valleys.

These ideas would not at first sight appear to present much difficulty, except perhaps for the idea of 'porous' – and that is explained. One might think this is the sort of information which could be taken straight over and added effortlessly to one's stock

of knowledge – to learn it, it would almost be enough simply to be told it. What Robert wrote in answer to some worksheet questions would tend to confirm this view:

> The Thames is a river that goes through london in to other parts of england. It starts in cotswolds, the highlands. the thames starts in rock, the rock is limestone. In london the thames meanders its way through.
>
> The cotswold stone is limestone. Limestone was formed millions of years ago and was found at the bottom of the sea. Chalk is a very soft limestone so is marble*, limestone is a porus rock and it soaks up water. it was formed with other rocks mixing up.
>
> The thames valley was covered in thick forest and so were other places. But in high hills there was chalk and limestone and the water was drained into low ground so there were hardly any trees.

This is a fairly accurate account; his use of the notion of porosity makes sense. So we can say that, at one level at least, the information has 'got home'. According to one common way of thinking, the learning could now be said to have been achieved.

That might easily have been all that happened to the information, but in this case the interviewer invited Robert to recall it. He asked Robert what he now knew as a result of doing the work, and Robert told him, producing very much the same sort of statement as he had made in his writing, and leading us again to suppose, 'Yes, he's got it'. Then there was a silence, confirming the sense that everything had been said. The interviewer then gave Terry a lead, and a conversation started between the boys. Everything, it seems, had not been said.

Here is the first part of the transcript:

1	Interviewer	Robert, what have you learnt by doing this latest worksheet? What do you know now that you didn't know before?
2	Robert	About er, the Iron Age, and the Stone Age, and things like that. About the weapons they had

* Presumeably he means that marble is a limestone (which it is), not that it's very soft.

		and things, and about the er they had to go to er you know places where there weren't any forests, which was quite hard, so they had to go in the high hills where there was porous rock, and the water soaked through to the bottom so no trees could grow.
3	Terry	What shall I say?
4	Interviewer	Well, have you got any comments on what he's said?
5	Terry	Er, about the porous rock. If there was a porous rock, then lots of birds and that would sit on it to drink and that, and probably do their droppings at the . . . so that trees and plants and that would grow there. Instead of soaking right through, you get some plants up there.
6	Robert	You wouldn't get any plants up there because the porous rock would soak it through. It wouldn't stay at the top. So birds *wouldn't* be about, any moisture at all.
7	Terry	Yes, well some of the water might stay on top.
8	Robert	No, not in porous rock.
9	Terry	Well, how do you think the birds lived?
10	Robert	Don't know really, I suppose they'd go to a different part of the country, wouldn't they. Different country . . .
11	Terry	They must have lived on something. And drank.
12	Robert	Well, they would have gone down near the bottom of the hill, you know, or somewhere where the water comes out, where the water comes out . . . when it goes down to the bottom it soaks into the bottom so you'll find more forests at the bottom of the hill than the top of the hill, 'cause there's more porous rock at the top. In the, er, there was, then, it's told in the book . .
13	Terry	Up to now there's lots of caves where the stone age used to live and mainly, millions of years ago, these were made by water, soaking through the rocks, porous rocks and that and it made these caves, in the stone.

14	Robert	So water would soak through to the er to the you know hole, makes a hole in the, you know, soak through there
15	Terry	and it would come out somewhere and make a stream
16	Robert	and it would push, push, the water would push a great big gigantic hole in the rock and then stream down to you know to the bottom of the hill.
17	Interviewer	Have you seen any caves like that?
18	Robert Terry	No

So the knowledge, which Robert at first sets out for the interviewer as if saying, 'There it is – so what?' gets activated: it is put to use and tested, and in the process is extended and reshaped.

To track the main developments: Terry (5) because he has some idea of porous rock being able to hold water so that birds can drink it, challenges Robert's statement (2). The challenge forces Robert to *use* the knowledge he has: Robert's sources told him nothing about the presence or absence of birds, but he can deduce from what he knows that there wouldn't be any (6). (He is of course wrong, because the general idea that he is working from – that *all* the water sinks down, leaving none at the surface – is an over simple one. We discuss the question of error later.) In answering Terry's further point (9), he suggests (12) the birds would go to the bottom of the hills for water, thus applying his knowledge again. But this time his information proves inadequate: he discovers as he talks that he does not know why or how there is water at the bottom of the hill. First he says confidently that the water 'comes out' at the bottom of the hill, then says it again as if having a second look at the idea and sensing problems. When he had said earlier (2) that 'water sinks through the rock', he had added, automatically, 'to the bottom'. Sinking through to the bottom and coming out is the sort of picture that derives from watering plants and the water coming out of the hole at the bottom of the plant pot. But what would 'the bottom of the rock' mean? We talk about 'the bottom of the hill', meaning the valley, but that's the bottom of the visible outside slope, not the under-

neath surface of the rock – if there is one. Robert doesn't solve this here but becomes aware of it as a problem. To cope with this gap in his knowledge, he explains ''cause there's more porous rock at the top', which isn't a satisfying solution but is the best he can do for the moment.

As they learnt it, their information did not refer to caves, but they both already know something about them and want to bring the new information about water in porous rock into line with their vague existing knowledge about caves being formed by water. Terry raises the issue and Robert senses an incompatibility between his information about water *soaking* down through the rock and the sort of *vigorous* action necessary to make a cave. To resolve the problem he proposes a hypothesis (16) involving some sort of build-up of pressure bursting a hole in the side of the hill.

So the *implications* of the information are being drawn, and old knowledge is being brought out and looked at afresh in the light of the new. Inconsistencies and gaps are being revealed in the course of talking, and are either resolved by new hypotheses or left unsolved: in either case, and whether the hypotheses are right or wrong, progress has been made because the mind is now as it were pre-set to be receptive to relevant new information when it comes along – whether it be the sight of grass and birds on Salisbury Plain, or of a stream pouring from a hillside, or verbal information to the same effect.

That some of their ideas – both ones they bring with them and ones they produce now – are wrong, we have already seen.

In the section that follows we can plot the process by which each boy's errors become apparent (to himself and to the other) and are then corrected. In other words, we shall now observe a central educational process at work. (Two main issues are dealt with in this section: whether anything can grow on porous rock, and what is meant by the softness of porous rock. It's a lengthy stretch of transcript, but it seemed better to give it in one go than to break it up.)

19	Interviewer	What would you say 'porous' means then?
20	Terry	It means that it's not a hard base, it's a very

		soft one and it's like a sponge, and when you drop water on it it soaks in. It's like sand and dirt and that, when you drop a piece of water on it it soaks around.
21	Robert	And then there's a harder forms of sand, that, if you found any quicksand, if you dropped anything there you'd start falling in, soaking in, 'cause that's what the water did, water's soaked into the er sand and made it much softer. And it you know made a kind of forever hole in it, the sand filled it up, and made it all muddy water, so if anybody stepped on it, or anything went on it (A discussion of quicksand follows, which we omit.)
22	Interviewer	Anyway, going back to the porous rock, are you both saying then that nothing will grow on porous rock?
23	Robert	No, most things need water
24	Terry	No, I'm saying that it *will* grow on porous rock because if it's a wet rock then things will grow on it because they need moisture, and water, to live.
25	Robert	It's like saying that something can grow on a sponge then
26	Terry	Yes. Well, there's earth on the porous rock, isn't there. There must be a lot of earth and er
27	Robert	Yes, but earth needs moisture. And moisture . . . (inaudible)
28	Terry	like er shamrock, that grows in er on rock and that, don't it.
29	Robert	Yes, you find
30	Interviewer	What does?
31	Terry	Shamrocks. Some plants grow on rock, don't they?
32	Robert	If you dug far enough on porous rock, you know, on porous rock, you know, if you dug far enough, you'd be able to grow things, but otherwise you haven't got enough moisture at the top.

		(Section omitted – they say they haven't seen the cliffs of Dover.)
33	Interviewer	You've seen other chalk cliffs?
34	Terry	Yes
35	Interviewer	Now on the top of the cliffs, was anything growing?
36	Terry	Yes, grass and er some trees, very rarely, but I did see some grass and that growing on it
37	Interviewer	Yes, in fact grass does grow on top of chalk and limestone. Er – but not, you wouldn't get forests growing. There's some, there's some water is held at the top. You see, if it rains it takes a bit of time for the water to soak down, right down into the chalk, so while it's going down, that's sometimes time enough for plants to get all the moisture they need out of it. So there's enough for grass to grow. And then the surface
38	Robert	There isn't enough for trees.
39	Interviewer	Right.
		(further explanation by interviewer omitted)
40	Interviewer	Now you said right at the beginning, Robert, that these early men chose to live up on the top of the porous rock, and not down in the valleys.
41	Terry	But if they did, the rain would soak them down, they'd sink gradually and sink and sink, if it was a porous rock, 'cause it'd be
42	Interviewer	What would sink?
43	Terry	The house, if they . . . if they was living there.
44	Robert	Houses. They didn't make proper houses did they?
45	Terry	No, tents.
46	Interviewer	No, it's not like sponge, I mean, it's wrong to think of it as like sponge. Porous rock's more like, I mean it's like a piece of chalk. You dip it in the ink
47	Terry	It'll go blue
48	Interviewer	Yes, it'll go blue all the way through. But it

		doesn't collapse, does it. It's still hard, even when it's full of water, well, chalk rock is like that. It stays hard all right. But it's just that it's got a lot of holes in it, little holes
49	Robert	Yes, I know, it's like a piece of carbon, punch a lot of hole in it
50	Interviewer	Yes, or expanded polystyrene, it's like that
51	Robert	And it hasn't got big holes, it's got holes that you can't even see, unless you look too closely, with a microscope or something you'd be able to see some of the bigger holes. But er
52	Interviewer	You would, yes.
53	Robert	but they chose to live up there because they could go down the valley when they wanted to grow things in the fields. In the fields they only had to go to the top, in fact, because grass would grow, and they'd be able to grow the smaller things.
54	Interviewer	Like
55	Robert	Like wheat and barley and oats and you know little things anyway and corn, and er so they didn't need to go down, if they went down in the valley they wouldn't have any warmth or anything, 'cause too many things would be growing quite quickly, 'cause the, you know, they'd be growing because of water down there
56	Terry	Yes, but down at the bottom the water's sunk through porous rock and it makes underground streams along the bottom.
57	Robert	I know
58	Terry	How do you think that they get their water?
59	Robert	They get it from, because, doesn't all make water, it, if it makes underground streams, let's say that's, that's the top, well some of it would soak just a bit over, wouldn't it, would soak into the soil anyway
60	Terry	There'd be some streams, but not on the top.
61	Robert	Whether there's streams or not, they'd soak the soil, wouldn't they, with er water. So it would

go, rise, wouldn't it, the water would make the whole lot of the soil like a sponge, er, not like a sponge really, yes, like a sponge, because er you know you dip anything, you know a sponge, just a little bit, it'll go up the top wouldn't it, go all the way through

62 Terry Yes but what do you think they make their houses out of?

The point about having abstract and general knowledge, and the reason so much importance is attached to it in school, is that from it we can derive or deduce information about particular cases that we've never explicitly been told about. We can take it with us into new situations and it enables us to understand them and make predictions about them. The power of such knowledge is manifested in the capacity to *generate* information in new and unpredicted situations: conversely, it is often in applying abstract knowledge to particular realities in order to explain and predict that inadequacies in it are revealed. Here we have a good example of this: the weakness of Terry's knowledge of porous rock becomes clear not when he states it at the abstract level ('it's not a hard base' etc. (20)) but when he uses it to *derive* the prediction that houses would sink in porous rock. This idea is easily seen to be wrong and the interviewer then becomes aware of the underlying misunderstanding and corrects it.

So this example shows how inadequacies in general concepts may be shown up when the concepts are put to use in the course of talking. It also shows very well a particular way in which a concept may be inadequate, and the sort of adjustment that is required to correct it. It's clear from what Terry says that he not only thinks that porous rock is soft (which it is – compared with granite) and like a sponge (which it is – in that it absorbs water) but that it is actually *soft like a sponge*, or like mud. His hang-up is that he's always understood rock to be 'hard': so on being told that this particular sort of rock is soft he takes it to be different from the rock he is familiar with. Putting this misconception right is a matter of revising his concept of soft/hard, perhaps changing it from a simple opposition to a scale with hard rock at one end, mud and sponges at the other and chalk somewhere in the middle, soft as rock goes but still harder than mud.

To correct the misunderstanding which has now become apparent the interviewer feeds in new information (37, 40 and 48). What happens to it? Look at what Robert does.

In the first place he immediately wants to *complete* it for himself: he takes the statement that 'it's got a lot of holes in it' (48) and *visualises* for himself what it must be like. When he says (51)

> And it hasn't got big holes, it's got holes that you can't even see, unless you look too closely, with a microscope or something you'd be able to see some of the bigger holes.

we have to take it that he is not saying something he definitely knows – nobody's ever actually told him that chalk has microscopic holes – but is *surmising* -- 'This is how it must be'; it seems he's using what he knows about some *other* substance as a basis for informed speculation or hypothesising about chalk.

Secondly, he discovers implications in the new information which affect what he had thought before. And he discovers them *only as he talks* almost as if tripping up over them. The interviewer has explained (37) that *although* water tends to pass through rock leaving the top dry, nevertheless the *soil* holds enough water for grass – but not trees – to grow. Robert (53) makes a statement which hasn't taken this into account:

> but they chose to live up there because they could go down the valley when they wanted to grow things in the fields.

He is still thinking that nothing grows on the hills so that the fields must be in the valley. But now, remembering what the interviewer has said, he reformulates.('In fact' signals a correction.)

> In the fields they only had to go to the top, in fact, because grass would grow, and they'd be able to grow the smaller things
>
> Like?
>
> Like wheat and barley and oats and you know little things anyway and corn, and er so they didn't need to go down.

So that it is only in the act of articulating what he thinks that he

realises what is implied in the new information.

This leads him to make a compensating adjustment to his concept of the valley (55) – it's not a useful but a hostile environment because the rich vegetation (caused by the plentiful water) would make it cold (a hypothesis).

Terry sees a problem in this (56): the water would be in *underground* streams: how then would it be available for plants? In response Robert produces a new hypothesis which somehow explains the presence of water by permeation through the *soil*, and doesn't depend on streams, but is cut off by Terry (62) who suddenly changes the subject to one of his own concerns.

There are many more points we could make about this discussion, but the essential one is that getting hold of information is not such a simple operation as is implied by that expression (or its equivalents – 'aquiring' concepts, 'grasping' ideas, etc). Information is not just taken on like cargo. Nor is it like being given something, as if now you have something where before you had nothing. Information isn't stuff. We can see from the transcript that when information is received it doesn't drop into an empty pigeonhole but comes up against what is there already – namely, other knowledge, more or less clear and explicit – and a process has to occur of marrying the new with the old. The new may be interpreted in the light of the old or the old may be modified to take account of the new.

We can't really be said to know something until we've made it part of our way of thinking and explored its implications for related areas of knowledge. Often this involves shaking-up and reorganising a whole system of ideas by which we explain the world to ourselves – and this 're-forming of the theory' goes far beyond any notion suggested by terms like 'getting' and 'acquiring'. 'Passive learning' is a happily discredited idea: but it's important to realise that the 'active' in 'active learning' refers less to finding information for yourself than to what you do with it when you've found it.

The transcript shows us how many things have to be brought into play in coming to understand what at first appears a relatively

uncomplicated set of ideas. It also shows what a lengthy and time-consuming business it is – all these words and all that time to deal with what is after all a very tiny part of school knowledge. And yet it seems to be indispensible: without the talk the boys would have been carrying round misconceptions and ignorances of which they were unaware, and the information they had 'learnt', not having been worked over and assimilated, would probably have been forgotten. Yet how many children in relation to how much of their curriculum have the opportunity *really* to learn in this sort of way?

It might be objected that in any sixth form we could find students who had a real understanding and knowledge and yet had hardly ever 'chewed over' ideas in this way with other people in the course of their work. The answer would seem to be not that the chewing-over process has not occurred but that it has occurred internally: in other words, the students have been thinking. But if we consider that very large number of pupils for whom most of school knowledge never really becomes part of their view of the world but instead withers and dies, the reason may indeed be that the process has not occurred – not in any form. We might have more success with such children if we deliberately made provision for this thinking, chewing-over part of learning to go on openly: which is to say, in language.

We can see by looking at what the two boys did what it was they needed to do, and in retrospect realise how far short Robert's brief *written* answers came of fulfilling those needs. Going back to them, we notice above all the brevity and *closed* quality of those answers. They sound confident in their knowledge; their sentences are well formed; they have an air of finality. (Terry's, which we didn't quote, were even shorter, equally confident in tone and mainly wrong.) But what they both *needed* to do, as we have seen, was to speculate, hypothesise, relate, explore – not to assert as if they were telling us something new what they had just got from the book.

The qualities of their *talk* on the other hand seem ideally fitted to the job of relating to new information. In the first place it seems a much more suitable medium than those short written pronouncements. This sort of expressive, informal talk, conducted

by people who know each other, can carry the movement of thought as it occurs – the galvanisings, the scanning for clues, the rapid switches of focus, the dawnings of awareness. Loosely structured, uneven in pace, full of stumblings, false starts and half finished sentences – and the more markedly so the newer the ground being broken – it's the natural vehicle for the first draft of our ideas. (It is only when we are confident in what we are saying that our discourse tends to be well-constructed, even and urbane.)

> and it would push, push, the water would push a great big gigantic hole in the rock and then stream down to you know to the bottom of the hill (16).
>
> If you dug far enough on porous rock, you know, on porous rock, you know, if you dug far enough, you'd be able to grow things, but otherwise you haven't got enough moisture at the top (32).

Secondly, the talking situation seems to produce a motivation that is absent from the written answers. Perhaps it is not surprising that Terry felt no great commitment to making accurate formulations in response to mere printed questions. How different it is with the formulations they make *for each other*. Every statement is made as it were from an exposed position and is liable to be challenged: there is a premium attached to getting it right. We need to inform ourselves of the sorts of situations in which children do care about getting it right, about checking the report against the reality to confirm that it is as they've said it is.

Can we make talk like this a regular classroom activity? In this case an adult was present with the two boys; but such an arrangement isn't always necessary. (On the other hand let's not be too hasty in dismissing it as impractical: are we really using all the adults available? Students? Other adults – do they have to be experts?) Provided they were prepared to be serious about it – and many children are – these boys could probably have got a long way without the interviewer. If we isolate what the adult has contributed we find it is mainly new information or corrections to misunderstandings: on the whole he responds rather than initiates, and most of their formulations are made at *each other's* prompting. Most of the *questions* come from them. So potentially they might have covered a fair part of the ground on their

own.

Here is an example of two other boys (also aged 12) who were on their own and who were serious about it. We quote it partly to illustrate what can happen without an adult, partly to advance our enquiry by showing information being operated on in another way. The boys asked for a tape-recorder, took it into a room on their own and read various things from their folders into it. As part of their work on India they had each written a story about the Aryans, who struggled over the Himalayas and down into the warm Indus valley, where they destroyed the city of Mohenjo-Daro. They have just finished reading these stories.

Robin That's a good one.

John Oh, you've described more of the mountains, I've just des . . . I've just done the battle.

Robin Yes, so really we've just done about the same, because I've described the mountains and you've described the battles.

John Yes, so in fact we both, it worked out better, didn't it.

Robin Yes.

John Well what do you think type of climate it is in India?

Robin Must be all snowy on the Himalayas and when they got down there, you know, it's sunny.

John Well, it depends, don't it, if they're right next to the Himalayas it might not be so sunny, it might be still a bit cold and yet, 'cause of the snow off the Himalayas.

Robin Yes.

John And you know, as they go, as the monsoon winds go to the Himalayas they might make the snow and it'll snow just before they get to the Himalayas.

Robin Yes, and where I put the snowstorm that would be right, wouldn't it.

John Yes.

Robin It's blow all the snow up.

John Yes. And not only that, it might even bring the water in from the . . . well, it depends what time of year it

is, don't it, really.

Robin Yes.

John But they would have, really, because you know, the wind blows in, brings clouds in with it and then instead of falling as rain they can't 'cause it's so cold it changes into snow.

Robin Yes. And er they probably lost a lot of men.

John No, I don't think they did.

Robin Going round them little pathways.

John Oh yeah, they might have lost it there but I don't think they did in the battle because

Robin No

John the people that they attacked were peace-loving people. They didn't know anything about war, did they. They just liked settling down and being happy and everything.

Robin Yes.

What concerned them was that the facts in their stories should be correct. 'Where I put the snowstorm, that would be right, wouldn't it?' This leads them to check what they've said about a particular imagined situation against the (general) knowledge derived from the teaching they've received. So the context in which this knowledge gets used – and thereby more deeply learnt – is a literary creation – very different from the situation of Robert and Terry; but the type of talk – loosely-structured, speculative, hypothesising – is the same.

We've now looked at two examples of quite impressive intellectual enquiry which proceeded in talk. We've said quite a bit about one element in these discussions: the type of language the speakers use. We've called it expressive. We've noted also that a certain commitment to 'getting it right' seems to result from another element, the fact that the speakers are in dialogue. Let us say some more about this.

As a vehicle for the sort of learning we've been discussing, dialogue has obvious strengths. Each participant continually forces the other to articulate what he thinks, to cope with awkward facts or arguments, to illustrate and exemplify, to oper-

ate on ground not of his own choosing: there is never any problem of what to say next, because if one is silent the other will speak; there is instant feedback which tells you whether you have made yourself clear and presents you with other relevant considerations which you have not so far taken into account.

On the other hand there are limitations: you may often not have the space you would like to expand your ideas, you are in constant danger of being cut off, and the other's interests may divert the conversation away from the area you were beginning to get to grips with.

So if 're-forming your theory' is what we see learning as, then we would expect that it might typically be in dialogue that the sudden insights are achieved which give a notion of how the modified theory will have to go; and parts of the new theory may be provisionally sketched out there and then. But it may also be necessary to set out the theory *in extenso*, rather than piecemeal as the shifting agenda of a conversation demands it. In such a task the active involvement of another person could be a hindrance: one needs a space to work in in which one is not going to be interrupted. So monologue would seem the appropriate mode of discourse: and written monologue would be superior in two respects to spoken, in that there is no pressure of time and in that it is possible to look back at what one has already said and thus control the overall shape of the structure.

But: no gains without corresponding cost. Monologue is more difficult to sustain than dialogue: this is because, due to the very feature that gives it its power – the lack of a participating interlocutor – the speaker gets no feedback (not at any rate in verbal form, and in written monologue not at all). When we write we speak into an empty room in the dark with no one to help us – small wonder children often fall silent after two or three lines.

We proceed then to look at a monologue and we will be concerned with two things: for the re-forming of the theory that we've suggested needs to go on under the impact of new information, what scope does monologue offer? And how, given the difficulties, is monologue sustained? The piece we examine needs once again to be a successful one – we're interested in the

possibilities of the medium, not its typical accomplishments – and because we want the process of composing to be as evident as it can be we choose a *spoken* monologue, but one that is like writing in one respect, that nobody else was there when it was spoken – only a tape recorder.

The speaker is an 11 year old boy, Trevor; he is in a cloakroom on his own with a tape recorder composing a talk that he is going to give to a group from his class on the subject of the development of man. With the rest of the class he has attended a 'lead lecture' on the subject by one of the teachers, but he has also (unlike his colleagues) spent a lot of time with library books learning more.

> The ice age . . . the temperature . . . as a matter of fact all the dinosaurs were dead, the temperature of our earth began to warm all the ice, glaciers and everything that had come down from the north pole sort of slowly went back sort of thing and melted up. Now the mammals, we had mammals as you know, that had survived, had the use of four legs at this moment. But they sort of learnt, it's funny how, I couldn't explain – they sort of walked a bit you know on their hind legs, you know, only occasionally. It was a sort of creature very much like a, oh let me think, a sort of . . . sort of thing, you know, bent down on four things, on four legs, like – but it sort of went up on two legs when it could. Now this mammal, it wasn't . . . vigorous. It was sort of above the others if you know what I mean. It was cleverer. It could do things better than the others.
>
> Now you see this sort of apish thing began to develop in more than one way. It was developing to walk on its hind legs very stooped, so that it went down on its four legs occasionally, but it also, what else was developing, which was apart from the dinosaurs that was developed and some of the other mammals, it developed in its brain. Its brain developed very, it sort of developed with its body, you know, it went with its body. It hadn't developed without its, it hadn't left its body or its body hadn't left its brain – like a dinosaur, you

know, it was too big and like a (?) or something. It was too big. It had such a small brain, because the brain hadn't grown with the body sort of thing, if you know what I mean.

Now the good thing about the dino – the apish, sort of gorilla thing was that its brain was also developing in a small way and it was learning how to make use of the things around it, not just like the dinosaur made use of plants and ate them. It learnt how to make a home and live in something. Now say it came to a hole in the ground it would know that there he could find shelter. Now if you saw a dinosaur saw a great big cave, a cave in front of it and it knew it could live in it, it wouldn't because it's just stupid. It wouldn't even know that it could live in it. And, see, these gorilla-like things knew that they could live in somewhere sheltered and it would save them about the wind and all the things around them. Now that was a very clever thing.

Now these were advancing slowly and through millions and millions of years we sort of end up with – it still stooped a lot, a very big face sort of thing, very much like a monkey let's say, or a gorilla again. Now these apes or gorillas or monkeys – I don't care what you want to call them – I'll call them apes, I think – apes, learnt all about the world and that they could make use if they thought. They used their brain because they had a brain and they had it, and it was big enough for their body. They thought to themselves we must use the world. They thought it, like, like this. Let's put it like this. Well, we might as well not be sitting on our backsides letting the world spin round and – well, they didn't know about that side – letting the world be here with all the trees and things, we must be able to make something out of it.

Now at this time this sort of things had begun to lose some of their hair that they had and they used, lived in caves. Now they ate a lot of vegetables at the time but now very cleverly they thought all these

animals, things around them, could be used to eat. And they used, they caught a rabbit in a sort of, put a, made a sort of hole with their hands and any little rabbit that they could catch and pounce on in time they would use it. They eat it raw, just skin it off and eat it raw, and some of the things that – this is what made them very clever the apes – was that it hadn't much hair left any more, just sort of thin bunchy thing, and it used the skin of what it pulled off to keep itself warm. Now, this was the first inclothed man in an animal and animals and how they began to learn how to move around and live.

Now these animals, these animals, they were still a sort of animal, began to learn how to make huts and things, and they developed in a very funny way. They sort of learnt to live with what was round them. Now the greatest development that they ever made was fire which I will tell you how they discovered later on. It would seem they, these had learnt how to live with the world and they had the intelligence that they used it. Now they was the rulers of the earth from that time on.

Now these animals couldn't make out how to keep themselves alive, and when they – say that they was attacked. They couldn't really figure out what they was meant to do except run. And eventually they thought, why not try and fight back again, and they learnt how to, if a wild boar or pig attacked them, they could get a stone or something and throw it at it and things like this. Now that made them the most intelligent thing in the world because no mammoth could come along and throw a stone at you, you know, and they learnt how to get milk out of goats, which I will tell you more about when I get on. But this is how they developed. The reason they developed so well was because their brains sort of developed with them, if you get what I mean. And this is the end of this lecture and thank you very much.

There's no doubt here: this is a case of setting out your theory

in extenso. This is no weary rehash of information he's been given, but a new construction, undertaken in a spirit of intellectual excitement that comes through even in the transcript. There is no need for us to trace in detail what is happening to his knowledge. He is learning as he speaks, hypothesising, deriving new knowledge from the old. (One example of the way he sees the potentialities in his own formulations: 'making use of the things around it' is first introduced, without great emphasis, as one characteristic of the new ape-man, but is then recognised for its significance and becomes *the* central distinguishing idea about man, under which other features – killing animals for food, wearing skins, throwing stones – are now subsumed as *examples*.)

Nor is the value of this process placed in doubt because at the moment some of his ideas are wrong or inadequately informed. (Man's ancestor wasn't a four-legged ground dweller but a tree-dweller; the move to the ground *and* the change of diet were occasioned by the disappearance of the forests.) Because the theory is being made explicit and hypotheses derived from it, its errors are out in the open. They will immediately draw attention to themselves when conflicting 'correct' information comes along – and we may be sure he'll be on the look-out for anything at all that bears on his theory. Knowledge on the other hand which remains shadowy, unarticulated and unused can neither be definitely confirmed nor definitely invalidated. The uttering of error may have been avoided: but that is only because the error-generating potential of the ideas has remained latent – it hasn't gone away. We can learn from error, but not from confusion.

Let's concentrate on the other part of our enquiry: the way the enterprise is sustained.

It's clear that such an ambitious organising and extending of one's knowledge will not take place without some powerful commitment – if only because it's very hard work. The struggles to articulate, the long pauses, the gropings for words which we hear on the tape make this clear: no one is going to put themselves through that without strong motivation. This is not the sort of gentle assimilating process we are all aware of in day-dreaming and in the thinking we do as we drive the car. Moreover, Trevor has to do for himself what Terry and Robert did for each other.

Their dialogue kept going partly because each sensed discrepancies between his own and the other's knowledge and they forced each other to spell out implications and articulate assumptions. (Robert, it is true, sometimes responds as well to his *own* statements, sensing problems in them, and himself providing the explication his interlocutor might have demanded.) But Trevor has to keep going entirely on his own, probing his own knowledge and questioning his own formulations. What we need to get at is how, under what circumstances, children find the commitment to perform this probing and questioning for themselves.

One circumstance we've already mentioned, which is common to the examples we've considered, is the absence of formal constraints on the language. Expressive language such as they use (Trevor included) is loosely-structured, tolerant of false starts, changes of direction and loose ends, and communicates the feelings and responses of the speaker as well as his ideas. It is in some ways close to the language of conversation though it is stretched and strained more than that language normally is.

Next, all these utterances which we've been looking at as articulated thought, and which we've taken to represent intellectual steps forward for the speaker, have of course been produced with the ostensible purpose of communicating with and informing *someone else*. The points made in the discussions were definitely directed at the other participants. (Trevor's audience is at one remove, in that this is only a draft of what he will say to them, but that they are a real factor in his utterances is shown by the way he sometimes addresses them directly.) They all speak in the knowledge that they have a friendly, interested and tolerant audience.

We can see how necessary this knowledge must have been in Trevor's case. The task he is undertaking is a difficult one and will involve him in visibly struggling to express himself and sometimes in failing to make himself clear: he is given the confidence to proceed nevertheless by his knowledge of his listeners. They don't understand the development of man as he does and will be interested to listen to him. He will be able to speak to them as an expert to laymen. If he had to speak before, say, an examiner, he might be inhibited from being adventurous and taking risks in

what he attempted.

It may also be that Trevor is helped in keeping up his flow of explication and elaboration by being able to envisage his audience's reactions to the points he is making. Perhaps he makes his statements more explicit by imagining the questions his audience would like to ask him. If his 'internalised audience' works like this, then it will again be important *what sort* of audience he sees it as.

Lastly, in all the examples we have looked at, the communication has been, so to speak, genuine. There has been a real reason for saying everything that has been said. The speakers have made available to their listeners ideas, views and responses which were available only from them, which they felt to be original and valuable and which (as they thought) their listeners would be glad to hear. (We might notice in passing that this is a different context of communication from the one common in schools in which the pupil writes down for the teacher things that the teacher already knows better than he does – an odd situation for the child, and one unlikely to encourage expansive articulation).

But that the speaker has something worth saying to say is not just an additional feature of these speculative learning processes but is the very thing we are trying to explain: the problem is, precisely, in what circumstances do children *have* something to say?

The conditions we've mentioned are clearly important – though they obviously can't explain *why* children undertake such strenuous probings of their knowledge. We've picked out the availability of a flexible expressive language; the sense of a sympathetic and interested audience; the genuiness of the communication as a transaction in a social situation – someone who wants to speak speaking to someone who wants to listen. The absence of any of these is likely to be at least an inhibiting factor – and the more inhibiting the less confident the speaker or writer: so that we may put children off committing themselves to words if for instance we frown on the informality of their expressive language or prescribe a particular form for their discourse. In other words if we want the water to flow we must keep the channels

open. But what if it hasn't rained for a month?

Suppose we scan the material again for clues as to the sources of the commitment they all display. What about interest in the topic? Robert and Terry didn't choose their topic and probably weren't very interested in it to start with. But they became interested and really put their best efforts into trying to understand – the workings of water in porous rock. Why should they care about that of all things? Maybe the topic isn't as arid as it appears: Robert seems actually to be attracted by the processes he's contemplating: and indeed, the idea of water pushing a great big gigantic hole in the rock and then streaming down is exciting, and the way water 'goes up to the top' if you dip a sponge in it is something we all like to watch when it happens in front of us. Nor is Terry neutral in his attitude to caves and underground streams. They seem to hit on these good things as they talk and as a result become more committed to the topic. But they also seem to be driven by the discomfort of sensing inconsistencies in their two views of 'how it is' and a pleasure in working out 'how it must be'. Dialogue once under way may, it appears, become a self-motivating activity – though it will be powerfully fed if it touches potent symbolic material like caves.

Trevor was awestruck by the scale and scope and slowness of human progress and the incredibility of the idea that small things like taking shelter and skinning rabbits represent great irreversible advances. There's no doubt the topic was what excited him.

But the climate of India seems even less of a guaranteed winner than porosity, yet here are two twelve year old boys of so-called average ability seriously speculating about it, without adult instigation, in a South London comprehensive school. Their seriousness is that of craftsmen who want to make their artefacts as good as they can be and can only do it by organising and examining their knowledge. So it seems pupils may *become* involved in getting at the truth while pursuing some quite different purpose – such as making a good story.

Commitment, then, isn't a simple affair. There may be a strong interest in the topic, but it needn't be there initially – it can develop as the talking or writing proceeds. Moreover, interests,

initial or otherwise, can arise from very diverse sources, and different children may be interested in the same thing for different reasons, any of which may suffice to draw them into the sort of efforts in language which lead them to fuller understanding.

Whatever the source of the involvement, we now return to the medium of its realisation. Most of this paper has been about talk: we've suggested that in talk children can go over their knowledge, look at it from different points of view, try it for size and kick it around; and that they often *need* to do this. We've looked at dialogue and spoken monologue as possible vehicles. When we now consider writing as a further possibility we must be struck by the fact that in most school contexts this vehicle is usually driven in completely different directions from the one we've been talking about. There is evidence* that it is typically seen not as a means of learning,but of recording information (for later reference or to fix it in the mind) and of showing the teacher how much has been learnt and understood. Yet what we've seen of the potentialities of extended monologue suggests that writing could be an important means of coming to grips with information and making sense of it.

If writing were to be used to such an end we would of course expect it to look very different from the 'subject writing' we're familiar with: in particular, if it is to allow the child to try out ideas he is not completely confident about, it will often have to provide a 'low-risk' situation free of the demand for a polished and final-looking performance, and so will, like talk, be likely to display features of looseness and informality and communicate a personal response to the topic; in other words, it will be expressive.

Examples of this sort of writing are not particularly easy to come by. (We'd like to receive more from teachers who are interested in getting in touch with us.) But we have two examples we'd like to quote, both by 13-year-olds, from the same history class but showing different sorts of possibilities. Both arose from a relationship with the teacher which allowed the children to be themselves without feeling they were on show (or on trial); both drew on an interest in the topic which had been created by good

* preliminary findings of the Writing Research

teaching.

Amanda was asked to write a Bolshevik political pamphlet. Instead she noted her *ideas* for such a pamphlet. It's interesting to speculate how far the expressive form her writing takes enables her to offer comments in a way that would not have been possible if she had carried out the task in the way she was asked to. The second example, which explains itself, is by *Trudi*.

Ideas for Pamphlet by Red Russians

1. *The war* Everyone, just about, wanted the war to end. This would be a good thing. We shall end the war, bring back the men etc. etc.

2. *The Czar* We would *definitely* get rid of the Czar once and for all whereas the Whites are more likely to let the Czar live and/or even bring him back to power. Restricted power, if they know what's good for them, to power.

3. *Bread* In stopping the war we would be more able to bring food to the cities. The trains would be free to bring what food there now is and the men would be coming back to farm the land again.

4. *The Land* The Whites said a piece of land for each man but we say the lands shall be owned by everyone so there would be no starving if you have a poor piece of land. *All* the land would belong to *all* the people.

5. *Power to the people* The power would belong to the people not the Czar or a Czar-orientated Government but to the people. The land would belong to the people governed by the people for the people.

6. *Work* Every technical advance will be used. The workers will have shorter days and better conditions because there is so much man-power, the advancement of machinery, especially in farming, has been very slow. The owners found it cheaper not to use expensive machines but we would be working not for profit but for the people.

7. *Join the army* They wanted men to join the army to fight the Whites. However, it would be very hard to get men who had just been fighting to join the army so they had to have some strong slogans like – if the Whites win they'll take your land away and send half of you to Siberia –

which wasn't true but it didn't matter if all you wanted was for men to join the army and they did.

What would you have done after Bloody Sunday if you had been the Czar? and what do you think the Czar did?

There were two ways the Czar could have taken:
1. to crush the rebellion by force
2. or to give the people civil rights

Myself I would have started having talks with representatives of the people to try and introduce civil rights although it would have been very difficult to pacify the people once they had been stirred. It would have been a lot easier if the people who came to the Square in front of the Winter Palace had not been fired upon. The changes would also have had to have been very fundamental which, if you and your family had had the supreme power that the Czar had had it would have been difficult to accept but anything would be better than war, civil war and disorder. One Council with representatives of the people, the army, the police, the secret police and the Crown would have had to have been introduced. Also a meet-the-people stint would have been a good idea. The whole family doing things the people did. Pictures of the princesses gardening, the Czarina cooking etc should have been dispatched. The Czar should have visited farms and mines and other places the people worked and even helped or had a go. The Czarina and the princesses should have visited the sick etc to show the people they were human. They should have stopped wearing so much finery. Maybe it wouldn't have worked but they should have tried. If they had visited the people and understood their conditions then they would have understood the people too.

The Czar I think the Czar's problem was he was too indecisive. He didn't take up a tough military plan to subdue the people or a rigid plan to get civil rights and understand the people. Instead he let it ride and panicked. He let others lead him and take the major decisions. He was also probably rather out of touch. If he had stood firm from the start either way, preferably civil rights, the results would have been better.

Both pieces are the result of an assignment set by the teacher. In the lesson which led up to the second piece, the teacher had broken off his account of the events at the crucial point: so the task he set simply provided an appropriate vehicle for the inevitable speculation. It involved taking what they knew and carrying it further, and also bringing in knowledge from other fields. (For instance, Trudi uses her knowledge of modern royalty's public relations procedures.)

The Bolshevik Pamphlet assignment asks for a construction, an imitation of a persuasive document. Writing it would involve taking the information you have and shaping it from a particular perspective and for a particular purpose. It would also involve bringing in your own wisdom about how people are persuaded. It is an invitation to take satisfaction from shaping a product, and the deploying of information would occur in the course of it. Amanda perhaps doesn't need this *extrinsic* reason for going over what she knows: she is interested less in the actual rhetorical construction and more in what ideas the Bolsheviks would present and why: and the loose form she chooses enables her to comment on the 'why'.

Of all the examples we have looked at – spoken and written – only the boys talking about porous rock and Trevor on the development of man can really be said to be 'rebuilding their theories' in a comprehensive and thoroughgoing way. The others certainly are making something of their knowledge by bringing it to bear on particular problems and are thereby making it real for themselves and getting inside it, but it's a gentler process. They aren't grappling with the information face to face to make sense of it, and discover what it amounts to, and see where they stand in relation to it. But then, not all information presents the sort of problems that call for this treatment. It seems that information which is abstract and difficult to comprehend, or which touches on powerful themes and deep concerns, or which is in some idiosyncratic way personally relevant to the learner, involves the person more completely in coming to terms with it. (Not that we can really claim to understand what makes a child go at it so wholeheartedly.) But if those are special cases, what is very often true is that information that comes to us from secondary experience – from teachers, books and so on – needs to be lived

through and felt on the pulses in order to be truly known. If this is so it may be achieved, as we've seen, by building some construct which need not be primarily informative in function, or simply by talking, or writing about it in your own voice and with the same expressive modulations with which you speak of your own experience.

In all the examples the child has done something with his knowledge because he has wanted to – though what he has done may not be what he started by wanting. In some form or other he has taken action himself.

When the child doesn't particularly want to take action, that's the rainless situation we referred to earlier. But the drought may be of our own making, and the solution may, paradoxically, lie in attention to the channels. In other words it may be because we have kept too tight a control over the talking and writing that some children have ceased to use them for their own purposes of establishing personal relevances in the information they have come across and relating new experience to their total picture of the world. But if talk has a regular and *valued* place in the classroom and its agenda is wide open, and if the talking and writing are of the sort that enable the children to conduct their own *unsystematic* explorations without fear of censure and to communicate what they most have to say when they want to say it; then the themes and ideas that, differently for different individuals, have a potential for calling up their deep concerns and interests and thereby motivating committed enquiry, stand a good chance of being hit upon frequently; and when that happens, the means by which what demands to be done may be done will be there to hand and in good working order.

We offer these ideas as a contribution to discussion, as we said at the beginning. We'd like some feedback – comments, criticisms and suggestions; and we'd appreciate being sent writing and tapes which are relevant to this investigation. (We guarantee to return them.) It would be good if we could make another paper out of the material and observations that come in in response to this one. But if you're interested in any way in the idea of this Project, we'd be glad to hear from you.

Some Relevant Books

Barnes, D., Britton, J. and Rosen, H., *Language, the Learner and the School*, Revised edition, Penguin, 1971

Jones, A. and Mulford, J. (Eds.), *Children Using Language*, O.U.P., 1971

Britton, J., *Language and Learning*, Penguin, 1972

Burgess, C. et al., *Understanding Children Writing*, Penguin, 1973

Rosen, C. and H., *The Language of Primary School Children*, Penguin, 1973

Acknowledgements:–
To the pupils and staff of the following London schools–our thanks for all their help: Chelsea School; Crown Woods School; Walworth School